



# BUSINESS INTELLIGENCE FOR THE TELECOMMUNICATIONS INDUSTRY

IMPROVING THE BOTTOM LINE AND CONTROLLING EXPENSES



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Christine Normile has more than 20 years of IT experience in engineering, consulting and marketing in top-tier companies. An accomplished product strategist and marketer, her vision and expertise in relational database management systems have driven notable revenue growth and cost savings for a number of products and companies. Christine is currently Senior Product Manager for Ingres Corporation where she is responsible for driving the future direction of the Ingres Database. Christine began her career as a software engineer in Sunnyvale, CA focused on performance management and spent many years consulting with clients worldwide helping them improve data server performance and implement solid IT architectures. Prior to joining Ingres, she was product manager for IBM's Informix Dynamic Server.

## INTRODUCTION

By 2011 global cellular phone service subscribers is expected to nearly double. Competition in the telecommunications industry is intense and several factors are forcing major changes. Mergers and consolidation have completely altered the industry's landscape and cross-border ownership of telecom businesses is making this a globalized industry. Deregulation and privatization will have a continual effect worldwide. Internet and wireless technologies are continuing to advance rapidly quickly changing customer preferences, disrupting traditional communication methods and forcing prices downward.

The telecommunications industry encompasses many technology-related business sectors including:

- local and long-distance telephone services
- wireless communications
- the Internet
- fiber-optics
- satellites
- cable TV systems

Cable companies are now aggressively offering local telephone service and Internet service. Telecommunications service providers are now selling TV via Internet protocol services, competing directly against cable for consumers' entertainment dollars and making the relationship between the telecom and cable sectors more and more complex.

Ingenuity, innovation, insight and a reasonable approach to spending and investment can help to move the industry ahead. To drive these, telecommunications service providers will need to employ cost-effective business intelligence (BI) solutions. This paper discusses how BI, built on Open Source technologies such as Ingres 2006, can help telecommunications vendors control costs and improve their bottom line in today's extremely competitive environment.

## TELECOMMUNICATIONS INDUSTRY OVERVIEW AND MAJOR TRENDS

In the U.S., the telecommunications sector drives more than \$1 trillion in annual revenue. Worldwide, the industry accounts for about \$3.5 trillion. As of mid-2007 there were over 2.3 billion cellular phone service subscribers worldwide. That number is expected to grow to nearly 4 billion by the end of 2011. Telecommunications employs nearly 1 million people in the U.S. making it one of the largest providers of employment in the world. Traditional broadband suppliers are being threatened in multiple ways. Very rapidly, municipal Wi-Fi systems are being developed, offering city-wide, high speed, wireless Internet connections at no cost or at prices much lower than DSL or cable access. Wi-Fi technology is limited to a range of only 150 feet or so. However an advanced wireless technology, WiMAX, with a range of up to 30 miles has the potential to disrupt traditional broadband, cell phone, landline and Wi-Fi systems. Phone service using Voice Over Internet Protocol (VOIP) promises consumers good value and the number of companies offering this service has increased dramatically and millions of households and businesses worldwide have signed up for VOIP service.

To retain customers, local phone companies are laying fiber-optic cable directly to the neighborhood and even into the home and office to provide ultra-high-speed Internet connections and enhanced entertainment online offerings. To combat attrition as cell phone owners drop their landlines and VOIP over cable takes even more landline customers away, traditional telecommunications service providers must leverage the internet and the new types of services it can provide. Major telecommunications vendors are focusing on bundled service packages which combine wireless accounts, very high speed Internet access, entertainment such as video on demand and internet TV, in addition to VOIP or landlines. Also, traditional telecommunications service providers need to create innovative new value-added services that are accessed online. For example, consumers might respond well to online services that monitor home security or adjust home energy usage, or services that monitor the movements and needs of elderly family members at home.

U.S. cellular phone companies are updating their networks to third generation systems (3G) which will provide Americans the features that consumers in many other countries already enjoy. This will drive changes in product offerings and rate charges as consumers vie to get access to lost cost international cellular access and other 3G services.

The competitive landscape continues to shift dramatically due to mergers and acquisitions. Government regulations are bringing big changes to business strategies as they continue to evolve quickly. Overall, the telecommunications industry is in a state of continuous technological and economic flux driven by intense competition and new technologies.

## BUSINESS INTELLIGENCE AND THE TELECOMMUNICATIONS VALUE CHAIN

Telecommunications vendors are rapidly acquiring significant product development capabilities as technology changes drive consumer demand. However, they continue to lag behind in understanding the customer. This has led to significant churn as products are developed and discarded in an attempt to retain existing customers and drive new business. Deregulation and increasing competition is forcing companies to move from traditional product-centric operations to consumer-centric operations. Customer demand for new services and lower cost services are forcing telecommunications service providers to increase their efficiency as never before.

Telecommunications vendors have to analyze their customers' needs and tailor all their business processes in the value chain to effectively meet their customers' unique requirements and increasing demands. Implicit in this argument is the assumption that telecommunication companies have the ability to turn large volumes of data pertaining to their customers and services into actionable information. Business intelligence systems can significantly help in almost all aspects of the value chain to achieve this objective. Figure 1 illustrates the telecommunications value chain. In the following sections we will focus on some of the BI applications in each segment of the value chain.

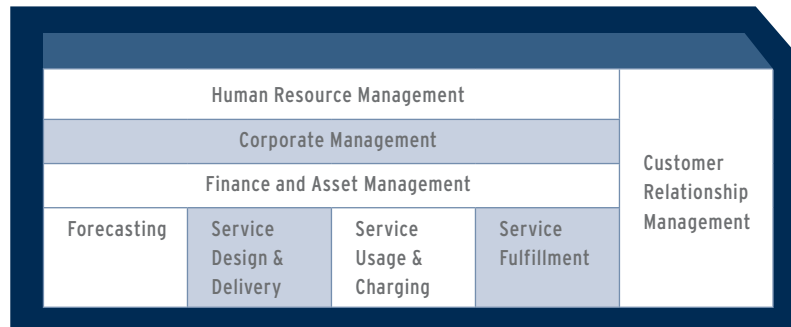


Figure 1:  
Telecommunications Value Chain

## CUSTOMER RELATIONSHIP MANAGEMENT

A typical telecommunications company has a huge customer base and varied product offerings. Many telecommunication companies will also service various markets across geographies ranging from local firms serving a combination of urban and rural communities to international vendors serving customers of different nationalities and lifestyles. To effectively interact with customers and design suitable offerings, the vendor's CRM strategy has to fully utilize the potential of business intelligence solutions. Telco's have to leverage the vast amount of data residing in existing systems at each step of the CRM process. The insight gained must then be applied to developing new products and services to meet the ever-changing needs of existing customers and to attract new customers. The ever-shrinking margins caused by increased competition mean that telecommunication service providers will have to seek innovative ways to minimize the cost of implementing effective BI solutions.



Figure 2: Business Intelligence and CRM

The CRM process in a telecommunications company has three steps:

1. Identify the most profitable or potentially profitable customers for future interaction.
2. Understand their needs and buying patterns, and
3. Interact with them so as to meet all of their expectations.

Figure 2 illustrates the role of business intelligence in each step of the CRM process. Right from identifying the most profitable customers to improving the overall quality of customer interaction, BI tools can go a long way in making the CRM strategy a success.

### Customer Profitability

For telecommunications service providers to thrive, it is imperative they acquire new, profitable customers as well as increase the profitability of existing ones. Identifying the most profitable



customers is the first step in that direction. To arrive at the overall profitability of a customer, vendors must quantify the costs associated in serving the customer over a period of time and the revenues realized from them during that period. The results of customer profitability analysis can help identify why some customers are not as profitable as others. For example, a customer might be unprofitable because the products used by them do not match their risk profile. Customer profitability analysis can significantly help in developing new offerings, customizing existing offerings and helping to target market segments for future growth.

### Customer Lifetime Value

Customer profitability is not the sole measure of a customer's value to the company. A customer may have the potential of buying profitable products in the future. A customer may also serve as an excellent reference for more profitable customers. Customer Lifetime Value is, therefore, a more meaningful measure. Often data mining tools are used to model customer lifetime value, taking into account all the factors that have a bearing on the customer's value over the entire course of their relationship to the company.

**Customer Segmentation:** Segmentation is used to segregate customers who exhibit common characteristics in different segments. These segments can then be treated as distinct entities and the future interaction with them can be tailored accordingly. Customer segmentation can save significant marketing effort. Often BI tools are used for customer segmentation. The tools use 'clustering' algorithms for segmenting the entire customer base into groups identified on the basis of various demographic factors and usage patterns.

### Customer Attrition

Acquiring new customers is much more costly than retaining existing ones according to numerous studies. Customer attrition analysis is an essential step in customer retention. It involves analysis of data captured during individual customer contacts at various touch points. For attrition analysis, customer contact data is coupled with other data sources like billing information. The resultant data set is then associated with customers who have switched to analyze the possible reasons behind the decision. The results can also be used to improve the performance of customer touch points.

### Customer Affinity

Affinity analysis, or market-basket analysis, reveals linkages between products that are likely to be purchased together and between product groupings and customer segments. These affinities can be, at times, extremely difficult to unearth and often business intelligence systems are used for this purpose. These systems use a technique called 'association analysis' for arriving at the right combination of products and services for a customer or customer segment.

### Target Marketing

Marketing to a specific customer group is a natural outcome of customer segmentation. Once distinct customer segments are identified, BI tools can be used to study the products likely to be bought by the segment. Often data mining is used to develop predictive models to establish the buying propensity of a segment towards various existing or new products. Armed with this information, marketing managers can design specific campaigns targeted at individual segments.

### Campaign Analysis

Effective advertising campaigns that consistently deliver on their marketing performance objectives are the result of skilled advertising personnel, extensive knowledge of the target market segment as well as excellent understanding of past successes and failures. BI solutions that bring together data from existing systems that deliver, track, and optimize branding and direct response marketing campaigns can help telecommunications service providers reduce the risk and increase the predictability of campaign execution. Campaign analysis is used to analyze the effectiveness of a marketing or promotion campaign. The effects of a particular campaign on sales of the promoted product can be tracked using business intelligence solutions. Often the surge in sales of the promoted product can result in decrease in sales of other related products. BI tools can also help identify such relationships. The campaign data is stored in a data warehouse and can be used to predict the effectiveness of similar campaigns in the future.

### Cross-Selling

Cross selling can be a major source of selling for a telecommunications company. For effective cross-selling, existing data can be leveraged using business intelligence solutions to quickly zero in on new products that may be required by existing customers. These can then be offered to them during the next contact.

## PRODUCT DEVELOPMENT

### Forecasting

To plan their networks, telecommunications service providers perform forecasting that helps operators to make key investment decisions. These decisions effect all aspects of the business including product development, launch, advertising, and pricing. Effective forecasting helps to ensure that the company will make a profit and that capital is invested wisely. BI solutions that use forecast data can help network planners decide how much equipment to purchase and where to place it to ensure optimum management of traffic loads.

### Service Design and Delivery

In response to fierce competition, telecom service providers must develop new products in order to offer a wide range of new value-added services faster and more cost efficiently. Design of effective services is enhanced through the use of BI solutions that provide information regarding the adoption and profitability of existing products and services.

### Service Fulfillment

Business Intelligence solutions can help telecommunications service providers improve customer retention and satisfaction through the effective analysis of service fulfillment systems. Information regarding installation, upgrades and repairs to customer's service can help the business reduce the cost associated with service fulfillment.

### Service Usage and Charging

Effective analysis of service usage and charge metrics can help telecommunications service providers prevent fraud, increase collections and provide the basis for new product development. In addition, this analysis can help in the planning for preventative maintenance of the infrastructure and for planning for network upgrades. Data from existing billing and receivables systems can be leveraged in BI solutions to help contain expenses as well as grow the business.

## FINANCE AND ASSET MANAGEMENT

The role of financial reporting has undergone a paradigm shift during the last decade. It is no longer restricted to just financial statements required by law. Increasingly, it is being used to help in strategic decision making. Many companies, in an attempt to improve financial reporting and decision making, have integrated their financial data in a data mart or data warehouse.

### Budgeting

Data warehousing facilitates analysis of budgeted versus actual expenditure for various cost heads like promotion campaigns, product development, infrastructure maintenance, investments, commissions, etc. BI tools can provide drill down capabilities whereby the reasons for cost overruns can be analyzed in more detail. It can also be used to allocate budgets for the next financial period. Various activity based costing models can be developed for better cost control and allocation.

### Asset Liability Management

Models can be developed using BI tools to measure the company's exposure to various risk factors like changes in interest rates. These models can be used to predict the performance of the portfolio under different economic scenarios and predict future liquidity needs of the insurer.

### Profitability Analysis

This includes profitability of individual products, product lines, and investments. A major component of profitability analysis is a thorough analysis of costs incurred during product development which can be a major factor in reducing the overall profitability of telecommunications companies.

### Reporting and Analysis

Swift decision making requires ready access to financial data via an intuitive interface. Increasingly companies are providing concerned executives web-based access to financial data. Our Ingres Icebreaker BI appliance has a web interface that can greatly facilitate ad-hoc querying and report distribution.

## HUMAN RESOURCES

Business Intelligence can significantly help in aligning the HR strategy to the overall business strategy. It can present an integrated view of the workforce and help in designing retention schemes, improve productivity, and curtail costs.

### Human Resource Analytics

HR analytics can be generated to support an integrated view of the workforce. Various analyses include staff movement and performance, workforce attrition by department, workforce performance by department, compensation and attrition and absenteeism. The HR data can be integrated with benchmark figures for the telecommunications industry and compared to help identify areas for improving profitability.

### Manpower Allocation

This includes allocating manpower based on new product launches and for major upgrade or expansion projects. According to increased requirements, personnel can be deployed in specific areas where demand projections are high or likely to increase.

### HR Portal

Employers need to maintain accurate employee data which can be viewed by the employees for information about compensation, benefits, retirement plans and other HR related information. Payroll data can be integrated with other HR information in an HR data mart and then be made visible within the organization through an HR portal.

### Training and Succession Planning

Accurate data about the knowledge, skills and abilities of the workforce can be leveraged using Business Intelligence solution to aid in succession planning. In addition, BI can help identify skills gaps and design training programs to bridge those gaps.

## CORPORATE MANAGEMENT

The top management of any telecommunications company has its own business intelligence requirements. The IT department is typically responsible for providing all the reports to them. It is also responsible for providing statutory reports to various outside agencies as well as meeting other information requirements within and outside the company. This may include information given to customers in the form of statements and other reports. A BI environment that leverages data collected across the value chain is possibly the only effective solution for IT.

### Corporate Dashboards

Performance measurements like product line profitability, overall development costs, and ROI can be presented in dashboard reports to top management to facilitate the decision making process. Also alerts can be triggered if any performance measure reaches a pre-defined threshold level. These reports can incorporate Telecommunications industry benchmarks provided by third party researchers.

### Statutory Reporting

Telecommunications companies have to provide statutory reports to outside agencies. These reports can easily be generated from the Business Intelligence environment.

## CONCLUSION

The Telecommunications industry is extremely varied in its adoption of business intelligence solutions. Quite a few companies are in the advanced stages of their business intelligence initiatives; yet there are many that are oblivious of the benefits of BI. Some companies are hesitating due to anticipated high cost and long implementation cycles that many Business intelligence solutions require. Some telecommunications service providers have gone for non-scalable temporary solutions which often fail to leverage the ever-increasing volumes of data. Hence, recognizing the need for an effective business intelligence environment based on the right architecture is vital. But it is just the first step. The real challenge is to make the BI environment an integral part of the decision making process. Efficiently gathering the information requirements of all the user-groups is extremely critical for the success of any BI implementation. In addition, clear business objectives must be established for the business intelligence solution. These objectives must meet the requirements of the business's top management in order to achieve success. The recent introduction of BI appliances, such as Ingres ICE Breaker BI Appliance, offers a cost effective solution that can reduce the typical BI implementation schedule from months to weeks.

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### About Ingres Corporation

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Ingres Corporation is a leading provider of open source database management software. Built on over 25 years of technology investment, Ingres is a leader in software and service innovation, providing the enterprise with proven reliability combined with the value and flexibility of open source. The company's partnerships with leading open source providers further enhance the Ingres value proposition. Ingres has major development, sales and support centers throughout the world, supporting thousands of customers in the United States and internationally.

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